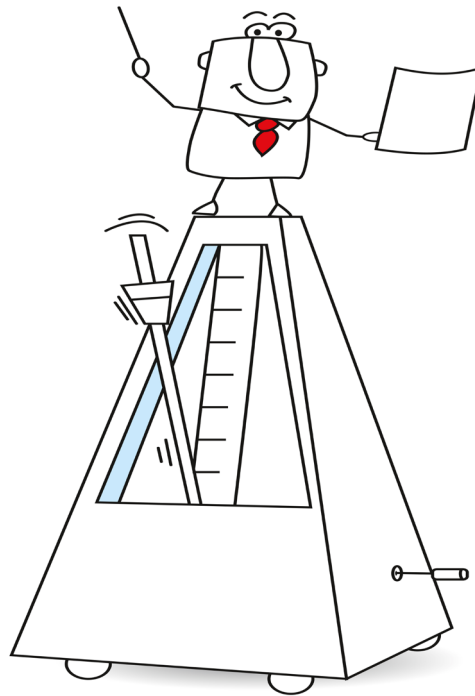


TAKT (TIME)



DEFINITION

Translated from the German word "Takt," meaning beat, rhythm, or pulse in music, it is frequently referred to as "a measurement of time."

The pace, speed, or tempo of work that needs to be achieved on the production line to match the rate of customer demand: the set rate of production/output against demand.

A calculation of available production time divided by customer demand.

THE CONCEPT AND FORMULA

The concept was originated by German aircraft engineers in the 1930's to help manage the increase in manufacturing

during WWII, and it was not long afterwards that Taiichi Ohno adapted it as part of the overall TPS JIT System to manage flow and pull production.

The formula for calculating takt time is simple and reflects the amount of time the operator/team and equipment must be actively engaged in the production process:

$$\text{Takt Time} = \frac{\text{Available Production Time}}{\text{Customer Demand}}$$

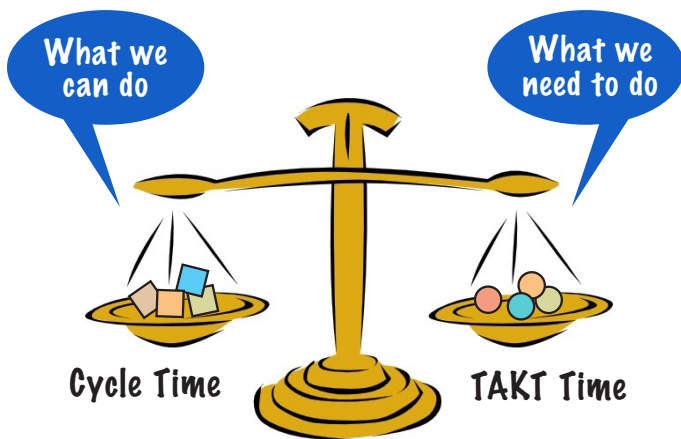
Once the formula is calculated, the goal is to monitor and make adjustments on the line so that takt can be adhered to as closely as possible, ensuring the rate of production is neither too fast, nor too slow.

Keep in mind that Available Production Time refers to any time during the production process the equipment is both running and available to produce. Therefore, shift changeovers, scheduled maintenance, employee breaks, meetings, etc. are not included in the calculation.

TAKT (TIME)

TAKT, PRODUCTION CYCLE, AND PRODUCTION LEAD TIMES: NOTABLE DISTINCTIONS

Takt, production cycle, and production lead time are 3 useful Lean metrics used to: reflect operational efficiency, help organizations better optimize flow and resources, and reduce unnecessary processes. However, they are often confused with one another. Read on to learn how they are different, yet interrelated:



Production Lead Time is the time a customer order is received in production until the order is completed. (Note: once production lead times are streamlined, pre- and post-production lead times should be addressed as they play a significant part in overall lead time reduction, i.e., removing waste from admin, order intake, materials receiving, inspection, shipping, packaging, transportation, etc.)

Production Cycle Time is the time it takes to produce a finished product.

Takt Time is the rate needed to produce to meet customer demand.

Takt is most effective in discrete, continuous flow manufacturing, where there is high volume and similar work content. The ideal is for takt and production cycle times to match; this takes some adjustment. For example, if takt time is more than production cycle time, your process will not be able to keep up with demand. If takt time is less than production cycle time, you are making more product than you will sell, creating excess inventory. The goal is to achieve a rhythmic, efficient, seamless workflow where materials are not wasted, and your customers are satisfied.

There are a handful of worksheets that will help you identify and align your takt and production cycle time. **(Copies of these documents can be downloaded at the end of the article):**

- **The Standard Work Sheet:** documents the current process flow
- **Time Observation Sheet:** charts how long it takes to complete each element of work
- **Process Capacity Table:** outlines the current capacity of the process
- **Standard Work Combination Sheet:** a pictorial of manual, machine, and takt time — from data captured on the process capacity table and time observation sheets

Additional process improvement principles that help achieve streamlined workflow, focus on CI and customer satisfaction, and drastically reduce variation and waste, include: **Jidoka** (automation with the human touch), **Heijunka** (production leveling), **Flow/pull** (or cell) Production, and Standard Work. (Click on each to view past Words of the Month).

A Note about Buffer and Safety Stock

Even with takt and production cycle times in sync, it is important to have a sufficient amount of back up inventory on hand in the form of buffer and safety stock. Buffer stock is insurance against fluctuations in demand, while safety stock is insurance against production delays such as downtime time, parts shortages, etc.

BENEFITS OF TAKT

Understanding Takt time, synching it with production cycle time, and making necessary adjustments to output, all allow you to improve efficiency and optimize workflow while ensuring:

- production matches demand
- a faster, level, consistent, continuous workflow
- increased capacity
- bottlenecks and breakdowns are more quickly identified and addressed
- reduced errors and improved quality
- standardization of work processes
- reduced process waste, overproduction, and storage costs
- more accurate delivery estimates, and financials
- removal of waste and bottlenecks (through implementation of Lean techniques such as **SMED** and **TPM**—click to check out past Words of the Month on each).
- more accurate resources and staffing estimates, training time, and reduced overtime
- better ability to manage process capability, downtime, machine speeds, etc.

TAKT (TIME)

BE MINDFUL

Keep on the lookout for fluctuations in takt time as customers' needs change, then adjust production cycle time and standard work accordingly. Careful synching of takt and production cycle time not only maintains a steady production flow, it helps uncover useful information about inefficiencies and resource allocation, as well as identifies bottlenecks which hinder efficiency and flexibility. Be aware of:

- Producing ahead of demand, which leads to overproduction and waste in spending on materials, storage, capacity, and wages
- Producing behind demand, which leads to underproduction and waste in "catch up fees" such as overtime costs, expedited shipping, and lack of future sales due to dissatisfied customers
- The need to make production lines (and tasks) level, capable, and adaptable to reorganization to accommodate unexpected changes in operator schedules and customer demand
- Signs of imbalance where some workers are being overworked, while others are left with little to do. Is this affecting employee morale? Absenteeism?

FOR REFLECTION

Takt time is most commonly associated with manufacturing production/assembly lines (with repetitive processes and products, i.e., automotive, apparel, and electronics); however, the concept of timing the flow of work to meet customer demand is applicable to many other industries and operations, such as:

- **Construction** (or other project-management based applications), i.e. — bridges, hotels, and tunnels
- **Service/Admin** — healthcare patient intake to release, customer service inquiry to resolution, call center operations, etc. For example, calculating takt time provides clarity to an engineering department that processes customers' requests for small product/process changes. They can see how many requests need to be processed each day to provide a one-day response lead-time, thereby allowing for staffing adjustments to meet demand.

In some instances, you may need to look to right-sized equipment, custom machinery and tooling specifically designed to promote flow and drive waste from the process by being designed smaller and placed closer to the point of use. For a deeper-dive into right-sizing, check out this article from *Stamping Journal*, "[Stamping Presses Produce at the Pace of Customer Demand.](#)"

TAKT...NOT TO BE CONFUSED WITH

Tact...sensitivity in dealing with others or difficult situations.

Having no idea of the benefits of understanding/calculating Takt time, Harry's Halloween House of Haute-Costumes needed an abundance of tact in their customer service department as reps handled calls from angry customers whose orders were delayed beyond Halloween. It seems the influx of orders for costumes 'post-covid' exceeded their forecasts and their ability to keep up with customer demand. A terribly frightful situation!

INSPIRATIONAL QUOTES

Almost all quality improvement comes via simplification of design, manufacturing...layout, processes, and procedures."

Tom Peters

"There is nothing so useless as doing efficiently that which should not be done at all."

Peter F. Drucker

**Interested in the forms we noted above?
Download a copy by following the links below:**

- [Standard Worksheet](#)
- [Standard Work Combination Sheet](#)
- [Time Observation Study](#)
- [Process Capacity Sheet](#)

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**Interested in talking about Takt Time? Email us at
info@productivityinc.com**